

## THE REBIRTH OF A ROMAN FORUM - THE CASE STUDY OF THE FLAVIAN FORUM OF CONIMBRIGA

ABSTRACT

ALEXANDRINO JOSÉ MARQUES GONÇALVES

ESCOLA SUPERIOR DE TECNOLOGIA E GESTÃO  
DO INSTITUTO POLITÉCNICO DE LEIRIA

ANTÓNIO JOSÉ NUNES MENDES

CENTRO DE INFORMÁTICA E SISTEMAS  
DA UNIVERSIDADE DE COIMBRA

The Flavian Forum of Conimbriga was located on the highest point of the ancient Roman city of Conimbriga (one of the largest of the west of the Iberian Peninsula). The municipality built the Flavian Forum, dedicated to imperial cult, during the reign of Flavius Vespasianus. Due to its architecture and location within the city, the Forum was one of the most important places in most Roman cities.

This paper presents a virtual model of the Flavian Forum of Conimbriga. It is common to question the accuracy of this type of architectonic model. However, this virtual model was built in accordance with the reliable blueprints in possession of Museu Monográfico de Conimbriga, from the time of the excavations.

The basic use of VRML to elaborate this work, allowed us to fine-tune some of the more problematic points related with historical reconstructions in virtual format:

- Accessible to a wide public over the Internet;
- Easy to use;
- File size (always a problem): small, very small;
- Performance via optimization techniques.

You can make your own "visit" to this historical place in <http://lsm.dei.uc.pt/forum>.

### INTRODUCTION

Beginning with the Middle Ages or perhaps before, questions related to the historical and cultural past, mainly at the level of archaeological findings, have exerted an enormous and mysterious allure on Man, who has come up with methods and forms to recreate such places.

Mainly in these past few years, the rise in number of projects involving this theme (historical reconstruction), has been real and effective due to two main factors: the increasing technological development that allows such designs to be accomplished more easily, with a larger impact; and the continuous and increasing interest of humanity for questions related to its cultural and architectural patrimony.

Some examples are Archeoguide ([archeoguide.intranet.gr](http://archeoguide.intranet.gr)), which implemented a prototype of Augmented Reality in the archaeological area of Olympia in Greece or 3D Murale Project ([www.brunel.ac.uk/project/murale](http://www.brunel.ac.uk/project/murale)), that in Sagalassos (Turkey) is developing and using 3D Multimedia tools to measure, reconstruct and visualise archaeological ruins in virtual reality.

### THE FLAVIAN FORUM OF CONIMBRIGA

The twelve campaigns of excavations carried out in the ruins of Conimbriga by the French Archaeological Mission in Portugal and the Monographic Museum of Conimbriga, between 1964 and 1971, led, in particular, to the discovery of the foundations of the former Forum in this ancient Roman city. The Flavian Forum of Conimbriga was built between the years 75 and 80 AD by the municipality during the reign of Flavius Vespasianus, dedicated to the Imperial Cult.

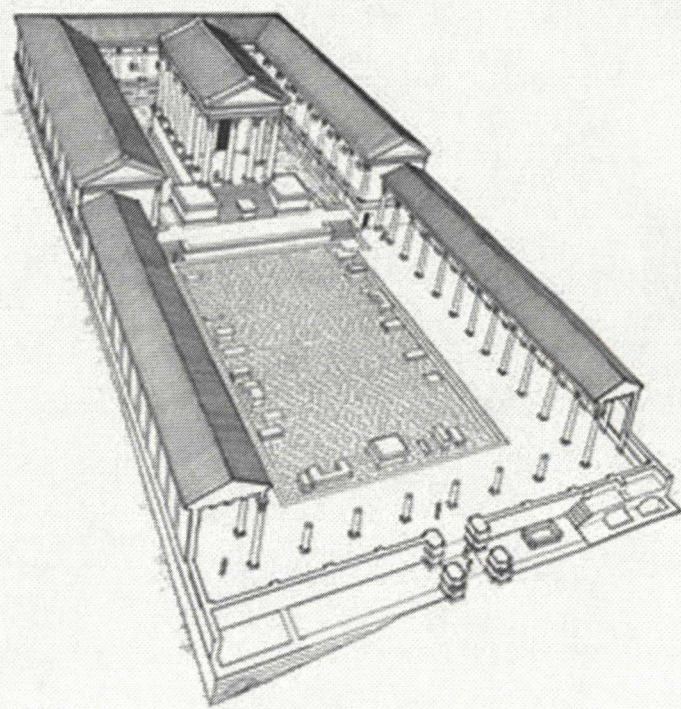


Figure 1 Image of the Flavian Forum of Conimbriga

Three monuments composed the Flavian Forum of Conimbriga: the temple, the porches of the temple and the porches of the Forum (the square). The temple of the imperial cult was raised on the highest point of the city, precisely in the middle of a sacred area. This location and its characteristics confer impressive dimensions, as was originally desired. This entire sacred area was surrounded by a porch whose function was essentially architectural. The square was the



civic place par excellence. Its two lateral porches were placed at an inferior level in relation to the porches of the temple and the floor was now covered with a meticulously lined up pavement (Alarcão et al. 1994).

#### THE RECONSTRUCTION

In 1899, Queen Amélia gave orders to initiate the archaeological excavations of Conimbriga, but only after 1930 were these excavations complemented and deepened in such a way that they show undeniable vestiges of a city constructed by the Roman civilization. The amount and quality of the archaeological findings presented an architectural and cultural capital of such impact that it was decided to let the general public have contact with this reality, significantly distinct from today's.

Any visitor of this space, when facing the scene of buildings in ruins, degraded floors or damaged columns, is unconsciously led to an imaginary time, by recreating, through the set of sensations assimilated at that moment, all the urban, social and architectural environment of those days. Given the distinct ability of abstraction and interpretation of each human being, even when based on drawings and blueprints, this task of recreating will always be full of imprecision, which can vary with the mood, age or even the cultural level of each person.

The work developed in this project, and now presented, had the main purpose to make it possible for everyone to pay an interactive visit, although virtual, to one of the most emblematic places in the cities of the ancient Roman Empire, the Forum. We recreated a three-dimensional model, as reliably as possible (from the number of steps of staircases to the number of columns, patterns of the time, colours, etc.) and at real scale, of the Flavian Forum of Conimbriga (Gonçalves 2002).

#### [1] The technology

Taking into account the characteristics of the project and the main goals, the technology to use would have the capacity to achieve good visual results but, at the same time, to supply the author with the necessary potentialities to carry out an efficient development. The choice was the Virtual Reality Modeling Language (VRML), a language that allows the creation of virtual environments, and that allows users, now converted into visitors, to explore the reconstructed spaces by simply moving the mouse.

Since VRML is the Web standard for publication of three-dimensional contents, the range of potential users will certainly grow when placing the reconstruction of this historical relic on any Web server, where anybody, anywhere will be able to easily take a trip in time and visit one of the monuments of the ancient Roman Empire.

#### [2] The working tool

To carry out this work, we use a tool that operates natively with the VRML, the Cosmo Worlds 2.0 from Silicon Graphics. This tool allowed us to perform a supported and gradual development of the project. Its characteristics and

potentialities, where part of the responsible items for the final results.

#### [3] Historical accuracy

In these types of historical reconstructions, the question of scientific veracity of the architectural model to use is always argued and a motive for profound analysis. There are situations where the lack of consensus between investigators causes the presentation of more than one proposal for the model of the space or area to be recreated. In the case of the Flavian Forum of Conimbriga that did not happen. The excavations, concluded in 1971, culminated with the attainment of trustworthy blueprints of the near total of the architecture structure of the Forum.

This way, the blueprints elaborated during that period and gently yielded by the head of the Monographic Museum of Conimbriga, were our work base for "rebuilding" the Flavian Forum. The implementation of this work was, consequently, made solely with these blueprints, with the observation of the Forum ruins and the access to some of the removed fragments of its original construction.

We would like to refer that this work would not have been possible, without the direct contribution of the Monographic Museum of Conimbriga and mainly its Director, Dr. Virgílio Correia.

#### MAIN CHARACTERISTICS

Here are some of the main characteristics of this work:

#### [1] Realistic model and up to scale

It has already been said that the modelling of the Forum would be true to the original building and would be materialized to the real scale, which allows for:

- The possibility to visit the Flavian Forum of Conimbriga in the perspective of an inhabitant of that period, and thus have a real perception of the colours and forms of the architecture of the ancient Roman Empire;
- Simultaneously, and from that same perspective (about 1.70m high), give the visitor the real magnitude and impressive surrounding area of the Forum: the high and imperial temple with its colossal columns; the beauty and symmetry of the porches of the temple, whose sections we can now visit, unlike many of the local inhabitants (Alarcão et al. 1994); and finally the enormous square of cult and knowledge, where the members of that society met for their discussions.

The realism of our construction, compared to the 1st century building was approved by the experts, especially by the Director of the Monographic Museum of Conimbriga.

#### [2] Interactivity

Another main characteristic of this work is related to its interactivity. We intended to create a virtual space where the visi-



# Virtual Reality

tor (the user) could have complete autonomy of movements in the area of the Forum, which means he can go where ever he wants, following the path he chose, by using an interaction device (keyboard or mouse).

## [3] Guided Tour

Besides the total liberty of movements, we also created a version with a guided tour that shows all the monuments that constitute the Flavian Forum of Conimbriga, for eventual low levels of agility and dexterity when handling the devices that permit to simulate the movements in the three-dimensional space.

## [4] Easy to use

Whoever decides to visit the virtual space of the Forum will be presented with another feature of the virtual worlds elaborated in VRML: it is very easy to use. A simple touch of the directional keyboard keys or a click and drag with the mouse, and any layperson in the matter will be able to move himself in the virtual space without any difficulty. All the movements are made in order to give the visitor a realistic perception of what would physically be happening to him, such as the notion of climbing stairs or falling off a high place.

## [5] File dimension

This was, without a doubt, one of the main achievements of this work. Due to the optimisation techniques used in the elaboration of the project, we were able to obtain a very small dimension of the files needed to generate all the visualization. For example, the main, and only, VRML file has approximately 22Kb. It is possible to store many copies of this work in a small and almost obsolete floppy disk, and practically without losing any of the realism obtained.

## [6] Performance

Still, due to the optimisations made in the elaboration of this work, and because this is a problematical item in the viewing of three-dimensional spaces in a low end Personal Computer (PC), the performance of this virtual space is fully satisfactory in any current domestic PC.

## [7] Accessibility

The access to some of the projects, namely the ones that involve the use of Virtual Reality techniques, is normally restricted and limited because of the specificities used in its development and/or its visualization, which, in general, unable the presenting of these kinds of projects to the wide public, for example over the Internet. Our work tries to differ from that tendency.

The two last points presented in this paper ([5] and [6]) have contributed much to this fact. Due to the language used, the VRML, and the results of the optimisations made, all the care placed in the search of a good balance between realism, performance and files dimensions, resulted in a final file of reduced dimensions, easy to download and with a good performance in any recent computer. Therefore, any person using the Internet can easily access it. This work can be seen in: <http://lsm.dei.uc.pt/forum/>.

## [8] Cost of the project

This type of work is not very expensive, financially speaking, in contrast to others with similar objectives, namely the time required to implement it or the tools to make it possible (in VRML), where, for instance, all the applications needed for visualization are available for free.

Even after its conclusion, it is possible to make improvements to the realism of the recreated space, without any alteration in the VRML file. For this, a simple improvement of the textures used in the scene, automatically updates the visualization.

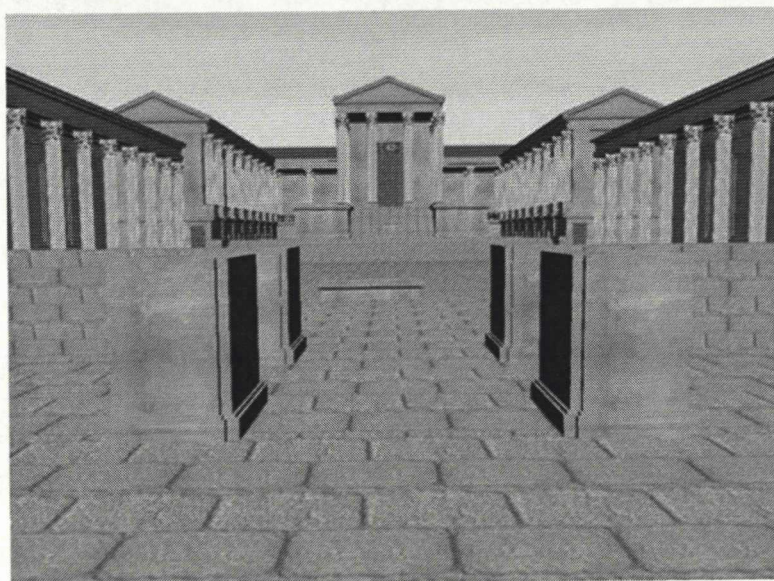


Figure 2 View (in greyscale) of the main entrance of the Virtual Flavian Forum of Conimbriga

## CONCLUSION

The last years have confirmed an increasing concern, mainly of great institutions such as UNESCO or the European Union, with the preservation, interpretation and spreading of the historical and cultural legacy of our ancestors. Such fact originated a new wave, where the use of new technologies, namely of Virtual Reality, acquires a larger role in the achievement of such intentions.

The Flavian Forum of Conimbriga supported the work presented in this paper, which aimed to recreate with accuracy, in a virtual way, this impressive but disappeared monument. The interactive three-dimensional representation enables a deeper contact, better than any drawing or written description. The work has, thus, a double function: pedagogical and social. Therefore it enables the



"reading" of the past to some levels and it assures the transmission of culture to future generations. And since anyone, with no exception, can access it, this work contributes to a true democratisation of knowledge.

Thus, and for the accomplishment of this design, all the area belonging to the Flavian Forum was modelled three-dimensionally (with exception of the interior of the temple) to the real scale and always with special care to preserve its geometric characteristics, so that the historical precision, always essential in these situations, is unquestioned.

This work also intends to contribute, even if modestly, to the spreading, preservation - by preservation we also refer to the "reconstructions" by scale models, drawings or virtual representations of spaces forever lost - and better knowledge of a past, which is important for both the historical interest and the values that the Flavian Forum of Conimbriga represents.

#### REFERENCES

- ALARCÃO, J., ETIENNE, R. and GOLVIN, J.-C., 1994. A Maqueta do Centro Monumental Flaviano. Instituto Português de Museus/Museu Monográfico de Conimbriga.
- GONÇALVES, A., 2002. Reconstrução de ambientes históricos utilizando VRML: o caso do Fórum Flaviano de Conimbriga. Dissertação de mestrado em Eng. Informática pela Universidade de Coimbra.